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DISCRETE MATHEMATICS (GATE 2023) - REPORTS

OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

ALL(33) | CORRECT(26) | INCORRECT(4) | SKIPPED(3)

Q. 31

Have any Doubt ?

In a survey on the gelato preferences of college students, the following data was obtained:
• 78 like mixed berry.
• 32 like Irish ice cream.
• 57 like tiramisu.
• 18 like both Irish cream and tiramisu.
• 16 like both tiramisu and mixed berry.
• 5 like all three flavours above.
• 14 like none of them.
How many students were surveyed?

136 — Your answer is Correct136

Solution :
136
Let the set of students who liked mixed berry M, these who like tiramisu be T and those who like Irish cream be I. Then by the inclusion-exclusion principle, the number of student who like atleast and of its flavours is

$$|M \cup T \cup I| = |M| + |T| + |I| - |M \cap T| - |T \cap I| - |M \cap I| + |M \cap T \cap I|$$
$$= 78 + 32 + 57 - 16 - 21 - 13 + 5 = 122$$

Now there are additional 14 who didn't like any flavour.
Thus, $122 + 14 = 136$

QUESTION ANALYTICS +

Q. 32

Have any Doubt ?

The less-than relation, <, on a set of real numbers is

A. Not a partial ordering because it is not asymmetric and irreflexive equals antisymmetric. — Correct Option

Solution :
(a)
Relation less than a set of real numbers is not antisymmetric and reflexive. Relation is not POSET because it is irreflexive. Again, aRb != bRa unless a = b and so it is antisymmetric. A relation may be not asymmetric and not reflexive but still antisymmetric, as {(1, 1) (1, 2)}. So, the relation is not a partial ordering because it is not asymmetric and irreflexive equals antisymmetric.

B. A partial ordering since it is asymmetric and reflexive.

C. A partial ordering since it is antisymmetric and reflexive.

D. Not a partial ordering because it is not antisymmetric and reflexive. — Your answer is IN-CORRECT

QUESTION ANALYTICS +

Q. 33

Have any Doubt ?

Let X be a set with exactly 5 elements and Y be a set with exactly 7 elements. If α is the number of one-one functions from X to Y and β is the number of onto functions from Y to X, then the value of $\frac{1}{5!}(\beta - \alpha)$ is

119 — Your answer is Correct119

Solution :
119

$$\alpha = {}^7C_5 \times 5!$$
$$\beta = ({}^7C_3 + 3 \cdot {}^7C_3)\, 5!$$
or $4 \times {}^7C_3 \times 5!$

$$\frac{(\beta - \alpha)}{5!} \Rightarrow \left(\frac{4 \times {}^7C_3 - {}^7C_5}{5!}\right) 5!$$
$$= 119$$

QUESTION ANALYTICS +

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